

hundred particular inquiries, some of which are very quaint, e.g. "Now that there are so many nature-books, how shall I choose the most useful one?" or, already, "Is nature-study on the wane?"

(2) Mr. Arthur H. Patterson has added a fourth volume to his series of east-coast books, and it is welcome, for the author writes with a light touch of the business of man and beast on the tidal waters of East Anglia. He describes at first hand much that is of interest regarding punt-gunning, decoying, snipe shooting, smelt fishing, shrimping, eel catching, and so on, and gives us delightful glimpses of the bird-life in particular. There is a great deal of fisherman's gossip in the book, but it is wholesome, open-air gossip, now and then cutting into the circle of the sciences.

(3) Sir Digby Pigott's nature-story for boys and girls is a sequel to "The Changeling," in which the author worked out, in a manner that pleased many, the idea of a child who was at one time a rook, at another a bee, at one time a fox, and at another a wild goose, and in due course a swift, a mole, and a short-eared owl. The author seeks to get young folks into close quarters with the real life of wild creatures, introducing them, through "Tommy's" adventures, to fur-seals and skuas, walrus and peregrines, and even to the dodo and "Archæopteryx." We find the book a little too informative, but it is kept, on the whole, commendably simple, and we doubt not that it may be useful for those children who really enjoy getting at things in this curiously circuitous fashion. The notes seem to us to be an artistic mistake.

(4) Dr. Graham Renshaw's natural-history essays are well known and justly admired, but he has excelled himself in the sequel, which deserves its title of "Animal Romances." With the help of more than a score of peculiarly interesting and artistic photographs, he has succeeded in giving us living pictures of many wild animals in their natural setting—giraffes ("the dream creatures," "the aristocrats"! Grevy's zebras ("the Horses of the Sun"), elephants ("the giants"), hippopotamus ("Behemoth"), and so on. He stays longest in Africa, but he takes us also to the Andes, to the Antarctic ice, to Tasmania, and elsewhere, and is always a lively guide. There is plenty of science in his nature-pictures, but there is poetry, too, and his book is literature of high quality.

TECHNICAL CHEMICAL ANALYSIS.

Technical Methods of Chemical Analysis. By Prof. George Lunge. English translation, edited by Dr. C. A. Keane. Vol. i., parts i. and ii. Pp. xxiv + 996. (London: Gurney and Jackson, 1908.) Price 2l. 12s. 6d. net.

A BOOK which covers such a wide ground as Prof. Lunge's "Technical Methods of Chemical Analysis" is by no means easy to review. No one chemist, for example, is likely to be practically conversant with all the branches of analysis which are dealt with, and, recognising this, the author has, as is usually the case in similar works, obtained those

who have specialised along certain lines to undertake the writing of such sections.

One of the difficulties to the reader of books like this is that to some extent it is a dictionary of methods, and it is sometimes a little bewildering to know which of many methods given for the analysis of one special substance is the best to employ. It is consequently not a book for the ordinary student, but one for the experienced worker, although even he will require to bring his critical faculty into play. The book is well written and is interesting to read, and those who study it will find it to contain quite an extraordinary amount of information which is by no means only analytical. The sections on clay and on clay wares, earthenware, and glazes are, for example, most interesting to read, even if one has no intention of carrying out the analysis. We like the arrangement of the section on potassium salts; first, all the methods employed are given in detail, and then the applications of these methods to special cases, such as analysis of Stassfurt salts, manures, beet ashes, and so on.

That the book is of the utmost value in the laboratory—in fact, almost indispensable—we can vouch, as since its publication it has been in constant use, and it is rarely that, within the scope of this volume, we have not obtained the information desired.

In conjunction with this volume an extremely useful little handbook of 260 pages, called "The Technical Chemist's Handbook," has also been issued. It is in limp cover, and of such a size that it can be carried in the pocket. Nearly 100 pages consist of tables, comprising, among others, factors for calculating gravimetric analysis, specific gravities, boiling points, tension of aqueous vapours, and weight of sheets of metals; there are, in fact, thirty-nine useful and valuable tables. The special part which follows deals with methods of analysis under various headings. To take an example at random, "III. Saltcake and Hydrochloric acid; A. Salt, B. Saltcake, C. Chimney-testing, D. Testing of the Gases in the Hargreaves Process, E. Hydrochloric acid." It should be mentioned that beside the thirty-nine tables referred to there are further tables in the special part, for example, the specific gravities of hydrochloric acid.

Dr. Lunge and Dr. Keane are to be congratulated on the issue of this volume, the one for writing it and the other for so ably editing the English edition. We hope that it will not be long before vols. ii. and iii. are ready.

BRITISH FOSSILS.

Palaeontographical Society. Vol. lxiii., 1909. (London: The Society, and Dulau and Co., Ltd.,

THE sixty-third volume of the Palaeontographical Society's monographs contains instalments of works already in progress, and the council announces its desire, so far as possible, of completing these before commencing new monographs, for which they have received numerous proposals.

Prof. S. H. Reynolds continues his monograph of the British Pleistocene mammalia, here dealing with

the Canidæ, comprising the wolf, the fox, and the Arctic fox. This part is illustrated by six plates, and there are a number of text-figures and tables of comparative measurements which should prove useful, but nothing calls for special notice except the determination of the problematic *Lycaon anglicus*, Lyd., as a somewhat abnormal wolf, a conclusion which seems justified by the evidence now available.

For our knowledge of the Palæozoic fishes of the family Palæoniscidæ we are mainly indebted to the researches of Dr. R. H. Traquair, who continues his account of the British Carboniferous members of the family, describing the genera *Acrolepis*, *Nematoptychius*, and *Cycloptychius*; the last three of the seven plates illustrate the genus *Rhadinichthys*, which will, presumably, be described in the next part. The predaceous habits of the larger Palæoniscidæ are shown by a specimen of *Nematoptychius greenocki*, with the remains of a good-sized *Acanthodes* in the abdominal cavity, and another point of some interest to which Dr. Traquair directs attention is that in round-scaled Palæoniscidæ (*Coccolepis*, *Cryphiolepis*, &c.), the scales on the upturned portion of the tail always preserved their original angular form, as they do even in the modern Chondrosteans. The probable explanation is that the markedly heterocercal tail of these fishes was a powerful organ of propulsion, and that no sacrifice of strength could be made to gain increased flexibility; the Palæoniscidæ were strong swimmers with wide gill-openings, differing in their manner of life from the more sluggish Crossopterygians and Dipnoans, with their restricted branchial apertures, paddle-like paired fins, and diphyccercal or hetero-diphyccercal tail.

In the fifth part of his monograph of the fossil fishes of the English Chalk, Dr. A. Smith Woodward concludes the Teleostomes and commences the Chimæroids. *Lophiostomus* and *Neorhombolepis* are described as highly specialised Eugnathids, but of most importance is a very full description, accompanied by a restoration, of the Coelacanthid *Macroptoma mantelli*. Our knowledge of the Crossopterygian fishes of the order Actinistia is gradually becoming more complete; it is now some years since Dr. Smith Woodward made the interesting discovery that the pectoral fin was supported by a series of four hour-glass-shaped pterygials, exactly as in typical Teleosts, and in the present case he has elucidated many details of cranial structure.

Mr. Henry Woods gives another instalment of his elaborate monograph of the Cretaceous Lamellibranchs of England, describing the Solenidæ, Saxicavidæ, Pholadidæ, Teredinidæ, Anatinidæ, Pholadomyidæ, Pleuromyidæ, Poromyacidæ, and Cuspidariidæ. Several new species are included, and the preparation of the synonymy of some of the others must have been no light task.

The Palæontographical Society spares no expense in order to ensure that its monographs are properly illustrated, and the present volume contains twenty-nine plates, ten of which are assigned to Mr. Woods's memoir; the beautifully executed reproductions of English Cretaceous fishes, drawn by Mr. A. H. Searle

to illustrate Dr. Smith Woodward's monograph, call for special mention. Indices to the Cretaceous Cephalopods and the Jurassic Belemnites, described many years ago, conclude the volume. C. T. R.

COMPARATIVE PHYSIOLOGY.

Handbuch der vergleichenden Physiologie. Edited by Hans Winterstein. Band ii., Physiologie des Stoffwechsel; Physiologie der Zeugung. 1st and 2nd fasciculi, pp. 1 to 320; 3rd fasciculus, pp. 321 to 482 of the first half of the 2nd volume; 4th fasciculus, pp. 1 to 160; 5th fasciculus, pp. 161 to 304 of the 2nd half of the 2nd volume; 6th fasciculus, pp. 483 to 658. (Jena: Gustav Fischer, 1910.) Price 5 marks per fasciculus.

THERE are being published in Germany just now a number of important works of a biological nature, in which eminent investigators are collaborating to produce a more or less exhaustive presentment of their special branches of knowledge. The fasciculi are published at short intervals as they are ready, and not necessarily in the sequence in which they will ultimately be bound together. The present work is the latest example of this method of publication, and the growing science of comparative physiology is receiving its due share of attention. The editor, Prof. Hans Winterstein, has an ambitious programme before him, and hopes to complete the work in four volumes. The list of selected collaborators contains the names of some of the best known of modern investigators; the majority of these are Germans, but the names of Fredericq, of Liège, Carlson, of Chicago, Tigerstedt, of Helsingfors, Bottazzi, of Naples, and Godlewski, of Cracow, also occur upon the title-page.

The fasciculi at present to hand will all ultimately be found in one or other of the two parts into which vol. ii. is to be divided. The first three fasciculi and the sixth are occupied with a single article from the pen of Prof. W. Biedermann, of Jena, and it deals with the digestion and assimilation of nutriment in the various classes of organisms; the article includes the consideration of plant as well as of animal life, so the term comparative is used in the widest sense. The article is left to be finished in future issues.

The fourth fasciculus is devoted to an interesting monograph by Prof. Léon Fredericq on the secretion of protective substances, in which we have an account of such materials from the nematocysts of protozoa up to the more elaborate means of defence found in the vertebrata; this includes an account of toxins, antitoxins, and the numerous other substances included in a general study of the vast subject of immunity. The monograph overlaps into and nearly fills the fifth fasciculus also, which concludes with the commencement of an article by Dr. R. Burian, an authority well qualified to deal with the subject allotted to him, namely, excretion.

The enterprise of our German brethren is to be admired in the conception of such a monumental work, and the preliminary fasciculi hold out the best promise for its future successful realisation.

W. D. H.